

Chapter 8

Operations and Maintenance (O&M) Manual

8-1. Purpose

Although there is not much to operate on a beach fill, there are sometimes auxiliary features that will require certain operations. Maintenance work and nourishment are generally needed as well as performance and condition monitoring during the economic life of the project to obtain the intended purpose. The beach fill, with or without structures constructed for local shore protection and appurtenant visitor facilities, will be operated and maintained to obtain the anticipated benefits. The purpose of an O&M manual is to present detailed information to assist the responsible interest in operating and maintaining the project, and to describe the periodic nourishment and monitoring aspects of the project.

8-2. Scope

The remainder of this chapter will present a possible outline for an O&M manual and briefly describe the contents of each section. A sample outline is illustrated in Appendix D. It should be modified to meet the needs of the individual project. The manual is divided into four parts. Part I presents general information about the project. Part II provides essential operation and maintenance information necessary to ensure the desired performance of the project. Part III describes the periodic nourishment and monitoring of the project, while Part IV presents information concerning responsibilities of parties involved in the project.

8-3. Background

a. Authority. Cite the authority(s) which authorized the project construction.

b. Location. Describe the project location relative to nearby urban centers, water bodies, or other geographic or demographic features. Give the north, east, south, and west project boundaries.

c. Brief description. Describe the major features of the project such as dune and berm heights, widths, and slopes. Give the volume of material placed, type and characteristics of any structures, and lengths, including transitions. Make reference to the appendix containing the as-built plans. Note the anticipated periodic nourishment volume and interval.

d. Protection provided. Discuss the protection provided

by the project and, if practicable, identify the storm parameters, or combinations thereof, for which the project would limit inland damages to a minor and acceptable level.

e. Local cooperation. The local cooperation agreement (LCA) should be included in an appendix and referred to here. Identify the local sponsor and those represented by the sponsor if more than one entity is involved. State the cost-sharing arrangement for periodic nourishment and project monitoring and cite the technical document which supports the LCA and cost-sharing.

f. Construction history. Review the contracts used in constructing the project indicating the contractor, contract number, award and completion dates, and any significant events or circumstances encountered, and the volumes of materials involved.

8-4. Operation and Maintenance

This part of the O&M manual presents information on general duties and procedures to assist local interests with their responsibilities for operation and maintenance of the beach fill project (see ER 1110-2-2902).

a. Management. Establish the local person or persons that will be responsible for project administration, maintenance, and operational responsibilities as outlined in the O&M manual. Appointment recommendation and approval procedures should be stated.

b. Duties. Delineate the project management duties related to the project as outlined in ER 1110-2-2902. Some of these duties are briefly listed below:

(1) Maintain public ownership and use of the beach which formed the basis of Federal participation.

(2) Prevent unauthorized trespass or encroachment onto the project.

(3) Ensure alterations are approved by the District Engineer.

(4) Ensure pedestrian and vehicular traffic are confined to designated access and use areas.

(5) Conduct periodic inspections, and operate and maintain the project as specified in this manual.

c. Periodic inspections. Routine or emergency inspections should be provided for here. The size of the inspection team may vary from the person in charge up to a team of three or four depending on the scale and

complexity of the project. Timing and number of routine inspections should be stated along with the features to be inspected, what information to record, and how and when it should be reported. A set of inspection forms should be developed to help ensure needed information is obtained. Inspection procedures to be followed before and after significant storm events should also be included. Notification from the District or some other mechanism should be included to trigger pre-and post-storm action.

d. Reports. An inspection report is to be completed by the inspection team for each inspection to ensure that no part of the protection project is overlooked. Any item requiring repairs should be noted and satisfactory items should also be indicated. A completed and signed set of inspection forms, mentioned above, plus any pertinent photographs taken during the inspection will accompany and provide the basis for the report content. In the event that repairs have been made, either temporary or permanent, the nature and date of the repair are pertinent and should be included. The address to which the reports are to be submitted should be given along with the timing of the reports. All reports should indicate project deficiencies discovered during the inspection, and the scheduled remedial measures to correct the reported deficiencies.

e. Improvements or alterations. Drawings or prints of proposed improvements or alterations are to be submitted to the District Engineer sufficiently in advance of initiation of the proposed construction to ensure that the absence of his approval does not delay construction. As-built drawings will be furnished to the District Engineer and maintained with the original plans.

f. Project features. Chapter 2 and remaining chapters of this part of the O&M manual provide a detailed description of the feature and its operational and maintenance requirements. Chapters will typically cover such features as the dune, beach berm, groin(s), nearshore breakwater(s), revetment(s), seawall(s), and bulkhead(s).

8-5. Periodic Nourishment

This section of the O&M manual provides procedures for monitoring the condition of the beach fill portion of the storm protection project, evaluating when nourishment will be required, and determining the volumes of nourishment needed. The project must be periodically nourished to ensure that the desired protection is provided throughout its life.

a. Scope. Refer to the design document and LCA to define periodic nourishment, its anticipated volume, and interval of placement. Explain the concept of advanced

nourishment. Discuss the parameters and conditions that will trigger a nourishment event. Direct quotes from the design document provide credibility for the need to nourish the project. If “renourishment is triggered when, in effect, the project reaches its design configuration” is quoted from the design document, then those responsible need to understand that the design section is the minimum section required to provide the protection and not the maximum section desired or constructed. It should be emphasized that the profiles discussed are based on the configuration of the project beach that is expected once the beach has reached its “equilibrium” state. In most cases, this will be quite different from the configuration shown on the plans and specifications or that is constructed.

b. Monitoring. There are various components that need to be considered to understand the performance of a beach fill project and subsequent nourishment requirements. To assure that the project is providing at least the design level of protection, knowledge of the project conditions via project monitoring, as discussed previously, is imperative. Consequently, a monitoring program is designed as part of the periodic nourishment of the project. The monitoring program will be administered by the USACE Engineering Division. Data collected during project monitoring will be used to assess the condition of the beach fill and to determine when to initiate a nourishment operation. See Chapter 7 and EM 1110-2-1004 for guidance on beach profile surveys, sediment samples, aerial photographs, wave data, etc. The application of these monitoring efforts to the project comprise the remaining topic items to be covered in this section of the O&M manual.

c. Nourishment. Moving material from the foreshore to the higher berm and/or dune area, or from an accreting area within the project limits is considered maintenance. Artificially adding new material to the beach fill project is considered nourishment. The need for nourishment is addressed by determining the protection provided by the existing beach fill project.

d. Routine monitoring analysis. The O&M manual will require routine inspection and survey of the beach fill project. Typical inspection forms are illustrated in Appendix D. These forms, as well as the inspections and surveys, should be tailored to meet the specific needs of the individual project. Routine analysis will compare existing profile shapes to a theoretical design equilibrium profile. This theoretical profile contains sufficient material to provide design level protection plus 1 year of advanced nourishment. If the comparison indicates that there is less than 1 year of advanced nourishment remaining in the profile, a beach profile erosion model is run to assess the remaining protection provided by the existing profile. The

focus here is on the volume remaining in the beach fill area represented by the profile. Based on the extent of the deficiency and the protection provided, a decision is made to initiate a project nourishment action.

e. Post-storm analysis. This analysis focuses on the protective features of the beach fill project located on the upper backshore portion of the beach consisting of the dune and/or the storm berm. Generally these features, once eroded, are not soon replaced by nature during post-storm beach recovery and therefore must be replaced by maintenance or nourishment of the project beach.

(1) Inspection and damage assessment will be conducted as soon as possible after the passage of a significant storm. A joint district and local inspection team will assess the project area. Ground photography will be obtained at a minimum and, if warranted, aerial photography will be obtained to document the post-storm conditions. The inspection will assess the visible part of the project (i.e. dune/berm erosion, damaged fence, destroyed grass, etc.). Typical inspection forms are illustrated in Appendix D.

(2) If the extent of upper beach erosion is judged to have compromised the integrity of the project, more extensive data collection and analysis will be required. The District will immediately initiate beach profile surveys at the monument locations as described in the monitoring program. Due to the expediency required in reacting to a storm event causing damage to the project and/or upland development, the District should establish and maintain an Indefinite Delivery Type Contract (IDTC) for post-storm surveying.

(3) Using the water level and wave height data from offshore gauges or other sources along with other physical data such as storm duration, wind speed and direction, the District will make an estimate of storm severity. This information will be provided to the local sponsor and appropriate District elements to document the amount of damages that the project prevented (reported in the "annual flood damages prevented" report). After collection and analysis of the survey data, a preliminary cost estimate of emergency maintenance and nourishment costs will be made by the District for local use and possible budgeting purposes.

f. Post-storm maintenance. Using the survey data, volume calculations will be made which will determine the quantity of sand required to restore the dune and/or berm to its design configuration. An assessment will be made as to the vulnerability of specific areas to additional damage during subsequent storms. An appropriate design of emergency maintenance will be performed. Survey data will be used to determine a source of sand within the project

boundaries to be used for the repairs. Once the design is completed and a source of material identified, a construction cost estimate will be prepared. Construction will be undertaken by the local sponsor or they may contract with the District to prepare and manage the contract.

g. Post-storm nourishment. If the above design and survey data indicate a need to obtain material from an outside source and the District and local sponsor determine the vulnerability analysis warrants such action, an out-of-cycle nourishment contracting procedure will be initiated and the proposed contract will be immediately advertised in the Commerce Business Daily (CBD). Design analysis will determine the required sand quantities and placement areas and the associated construction templates. Construction plans and specifications and cost estimates will be prepared, as well as related contract documents. Advertisement and award of the contract will be accomplished as soon as possible to allow as much flexibility as possible in scheduling the construction.

8-6. Responsibilities

The following paragraphs define the roles and responsibilities of organizations and organizational elements for implementing the provisions of the O&M manual.

a. U.S. Army Corps of Engineers.

(1) The Programs and Project Management Division will be responsible for overall project management, coordination, budgeting, and programming activities within USACE. Coordination and initiation of project inspections and damage assessments will also be the responsibility of this office with assistance being provided by the engineering and construction divisions.

(2) The Engineering Division will be the design agent for construction contracts. This office will be responsible for continual monitoring and will maintain an IDTC for post-storm surveying for a quick response in the event of a significant coastal storm. Geotechnical analysis required for the identification of offshore borrow sources will be conducted as needed to ensure that an adequate supply of suitable beach fill material is available. The design, cost estimates, and preparation of construction contract documents for emergency maintenance or nourishment will be accomplished here.

(3) The Contracting Division is responsible for providing support to other elements concerning contracting-related issues, procedures, and the processing of contract documents.

(4) The Construction Division will act as the construction agent for major maintenance (if an MOU with the locals exists) and nourishment contracts. Onsite control will be provided by an area office. This office will be responsible for management methods, procedures, policies, and interrelationships among the various local, state, and federal organizations associated with the various aspects of construction.

(5) The Planning Division is responsible for ensuring that all construction and related activities are in compliance with environmental policy, laws, and regulations. This office will also document the economic impacts of the project during coastal storms over the life of the project.

b. Local sponsor. In accordance with the Local Cooperation Agreement, the local sponsor is responsible for the day-to-day operation and maintenance of the project as described in this O&M manual. The local sponsor will

represent and act in concert with various local and state agencies. Therefore, the local sponsor will act as the liaison between USACE and the other agencies involved with the project. Acting in cooperation with USACE, the local sponsor will closely monitor the project and during storms, will disseminate the appropriate directives according to the severity of the storm event. The local sponsor will also act as the main POC for coordinating and participating in post-storm inspections and damage assessments.

c. Financial. This section of the O&M manual describes the assignment of responsibility for the payment of cost as provided for in the LCA. Generally, cost for operation, maintenance, repair, and rehabilitation of all parts of the project are assigned to the local sponsor. Replacement of advanced nourishment or nourishment of the protective dune and/or berm is cost-shared by the Federal government in accordance with the LCA.